SBE PhD Production and Employment: Pipelines and Pathways

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Do We Need to Reexamine PhD Training in the Social and Behavioral Sciences?

Most PhD Programs Prepare Students to be Professors, but…

- Every year, ~50,000 doctorates are awarded by US academic institutions.
- More than 50% of doctorate holders work in fields outside academia (discipline-dependent.)

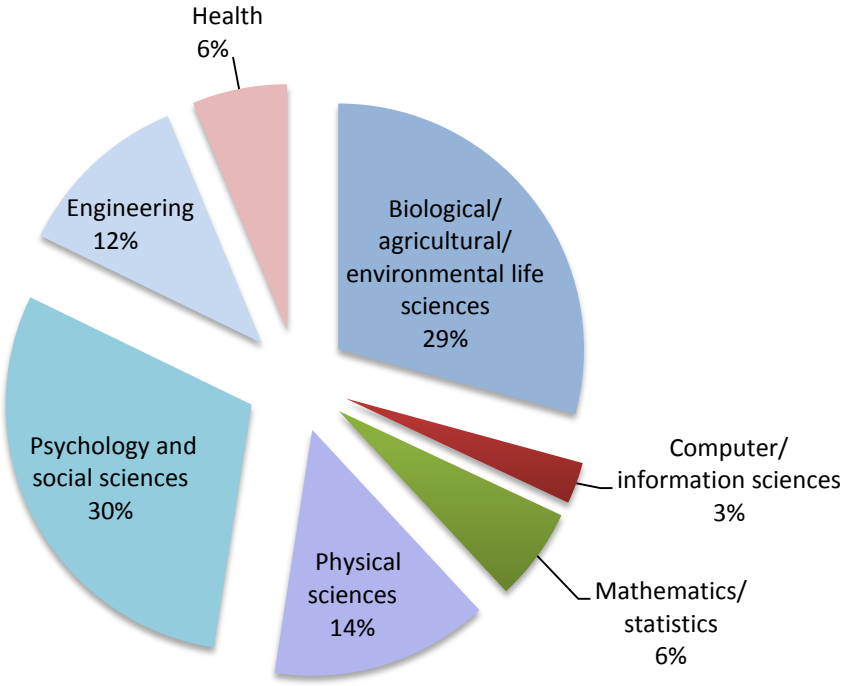
The Role of Federal Agencies in Graduate Education

Committee on Science

Source of Support	# Students
NIH	23,570
NSF	21,513
Department of Defense	8,445
Department of Energy	4,594
Department of Agriculture	2,625
NASA	2,423
Total Federal Investment	~$3B (conservative est.)

Behavioral and Social Scientists Are Among The Largest Components of the Science Workforce (30%)

2013 PhDs by Area: Note Combines Psychology and Social Sciences



Data from National Science Foundation, National Center for Science and Engineering Statistics, Survey of Doctorate Recipients, 2013; (http://ncsesdata.nsf.gov/doctoratework/2013/ table 17).

Doctoral Training in Social and Behavioral Sciences: Issues for Discussion

- How many SBE PhDs are awarded? How has this changed over time? How do the SBE numbers compare to those in Engineering and other Science fields?
- How long does it take to get a PhD in the SBE sciences?
- What does the job market look like for SBE PhDs?
- Postdoctoral training. How many post-docs should we train?
- What challenges do SBE PhDs face?

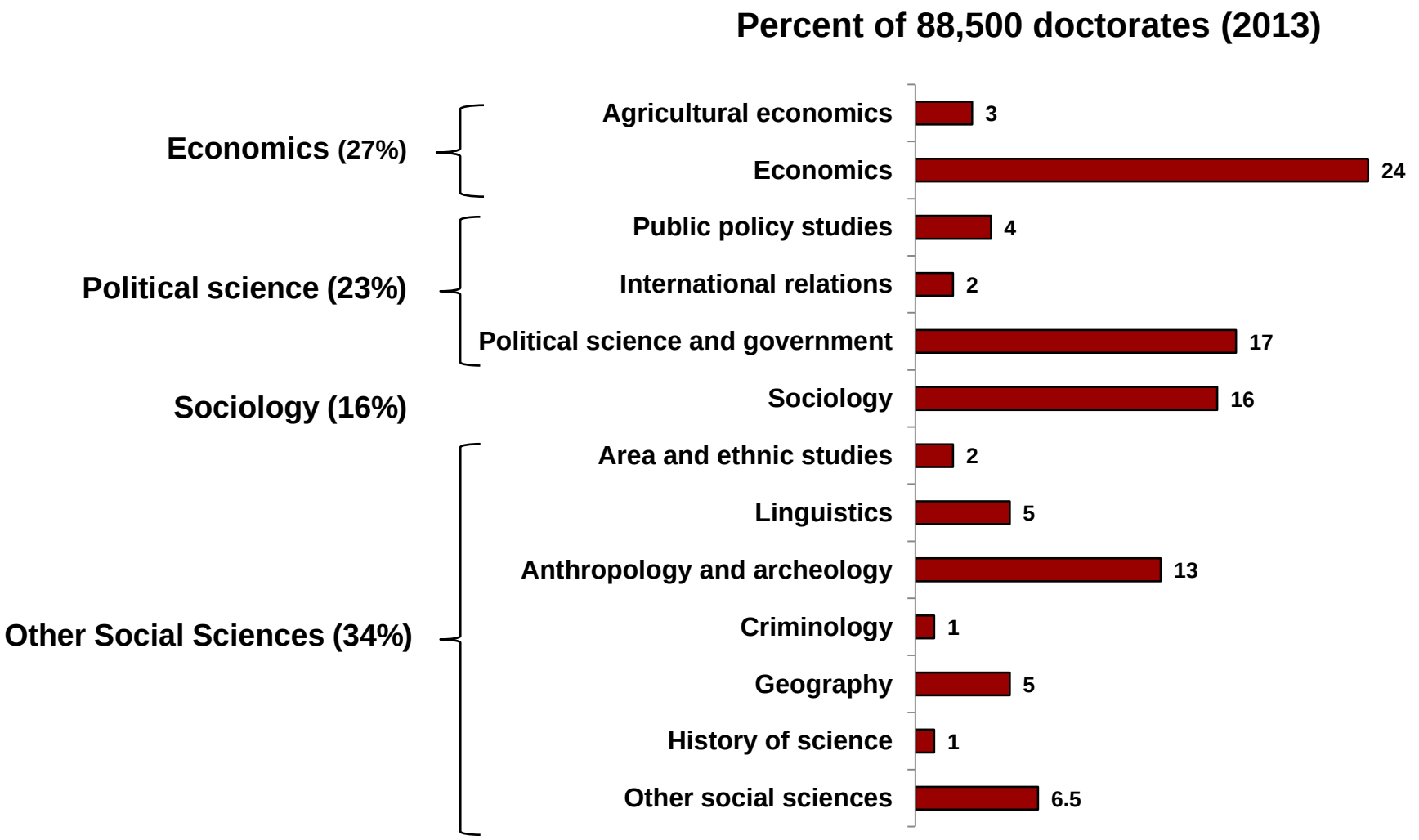
Issue 1

- How many SBE PhDs are awarded?
  - How has this changed over time?
  - How do the SBE numbers compare to those in Engineering and other Science fields?

What Data Are Available to Inform These Questions?

- Survey of Earned Doctorates (n = 52,760 in 2013)
  - Annual census since 1958
  - New research doctorate recipients from U.S. institutions
  - Selected data:
    - PhD production and years to degree
    - Employment and postdoc commitments in the year following doctorate award
- Survey of Doctorate Recipients (n = 47,078 in 2013)
  - Biennial longitudinal sample survey since 1973
  - Doctorate recipients in science, engineering and health from U.S. institutions
  - Selected data:
    - Employment rates
    - Employment sectors
    - Training received

What Fields Comprise the Social & Economic Sciences?

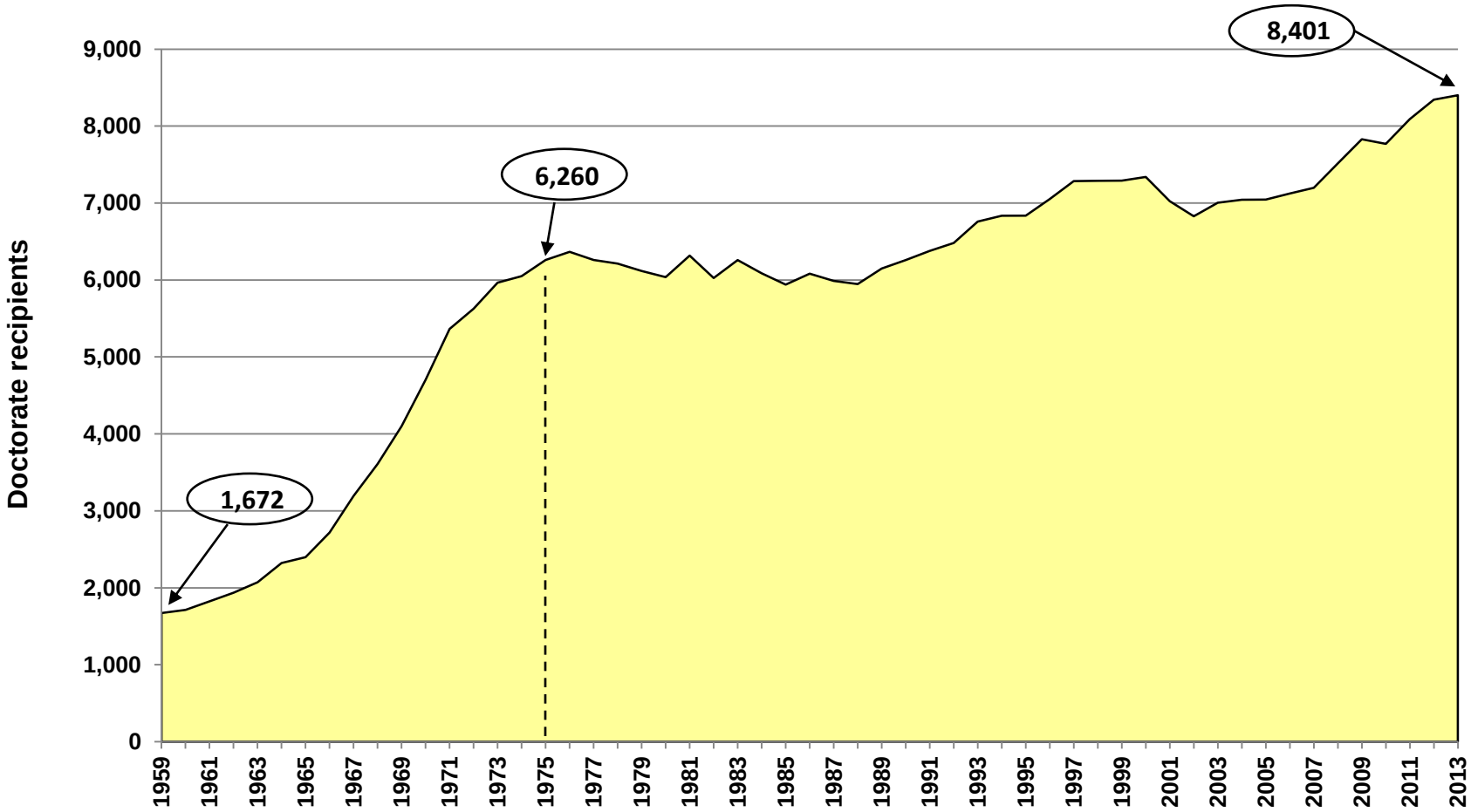


SOURCE: *2013 Survey of Doctorate Recipients*

What Fields Comprise Psychology?

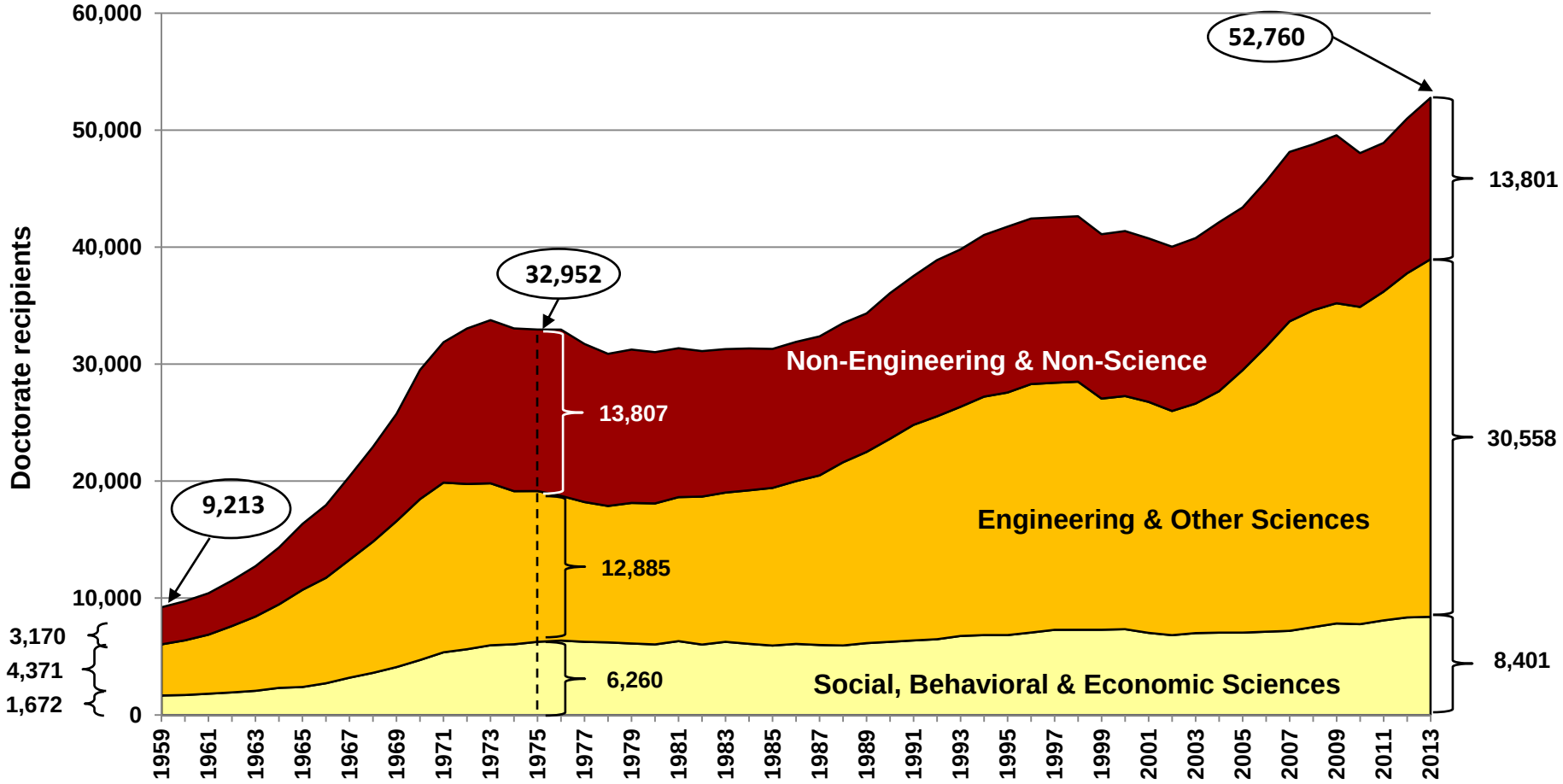
SOURCE: *2013 Survey of Doctorate Recipients*

Research Doctorates Awarded in SBE, 1959–2013



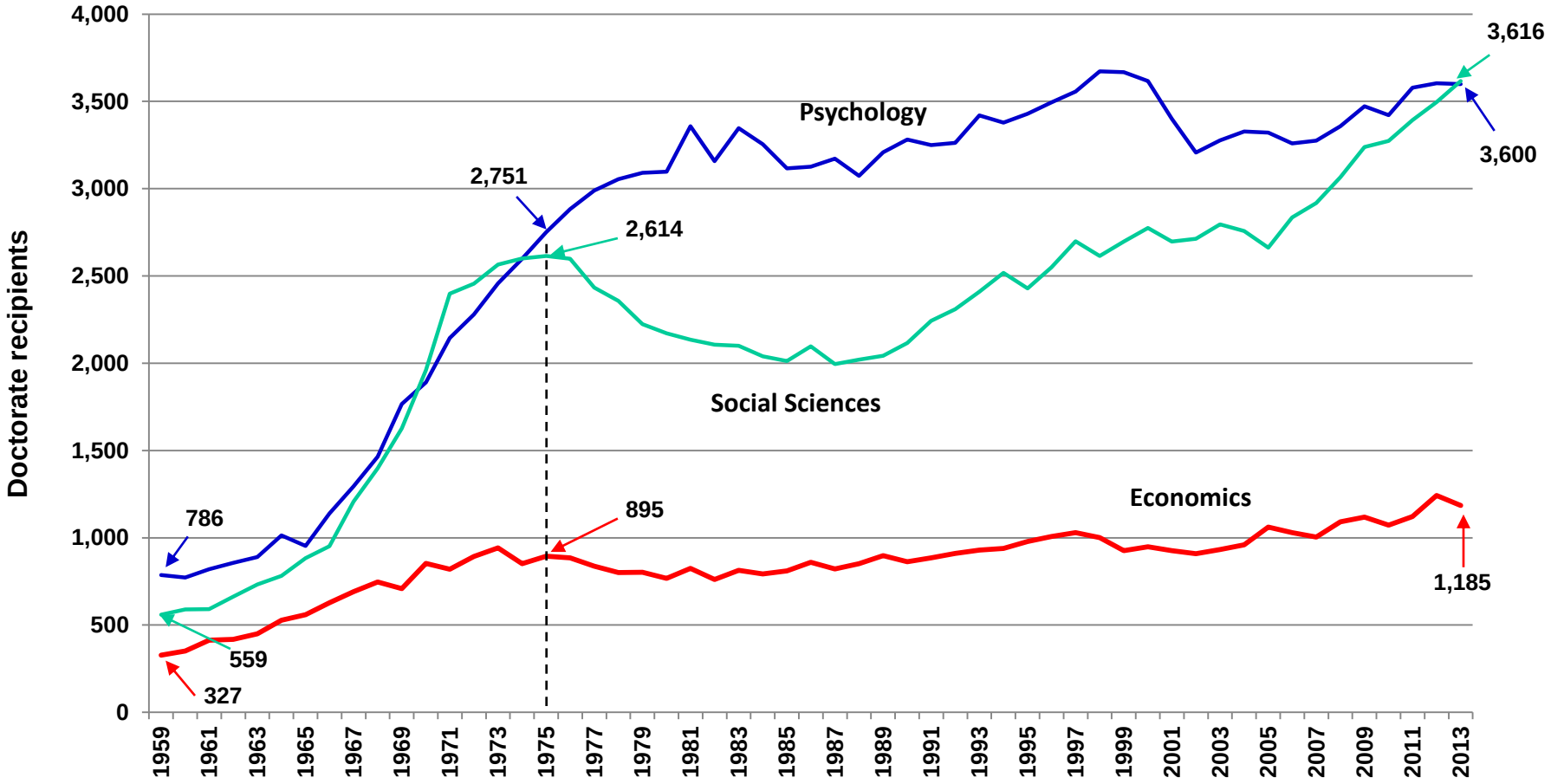
SOURCE: *2013 Survey of Earned Doctorates*

Research Doctorates Awarded, 1959–2013



SOURCE: *2013 Survey of Earned Doctorates*

Research Doctorates Awarded in SBE Subfields, 1959–2013

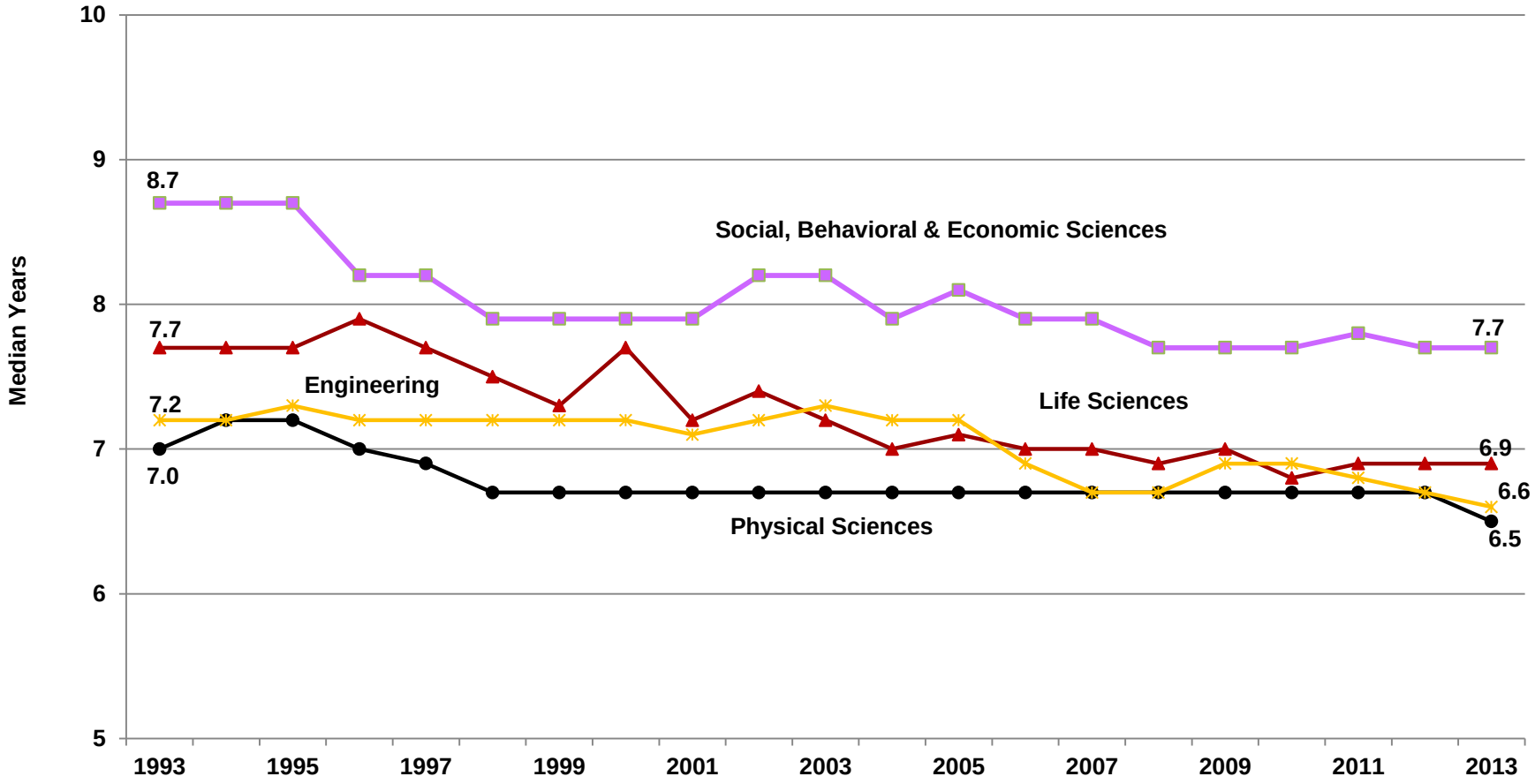


SOURCE: *2013 Survey of Earned Doctorates*

Issue 2

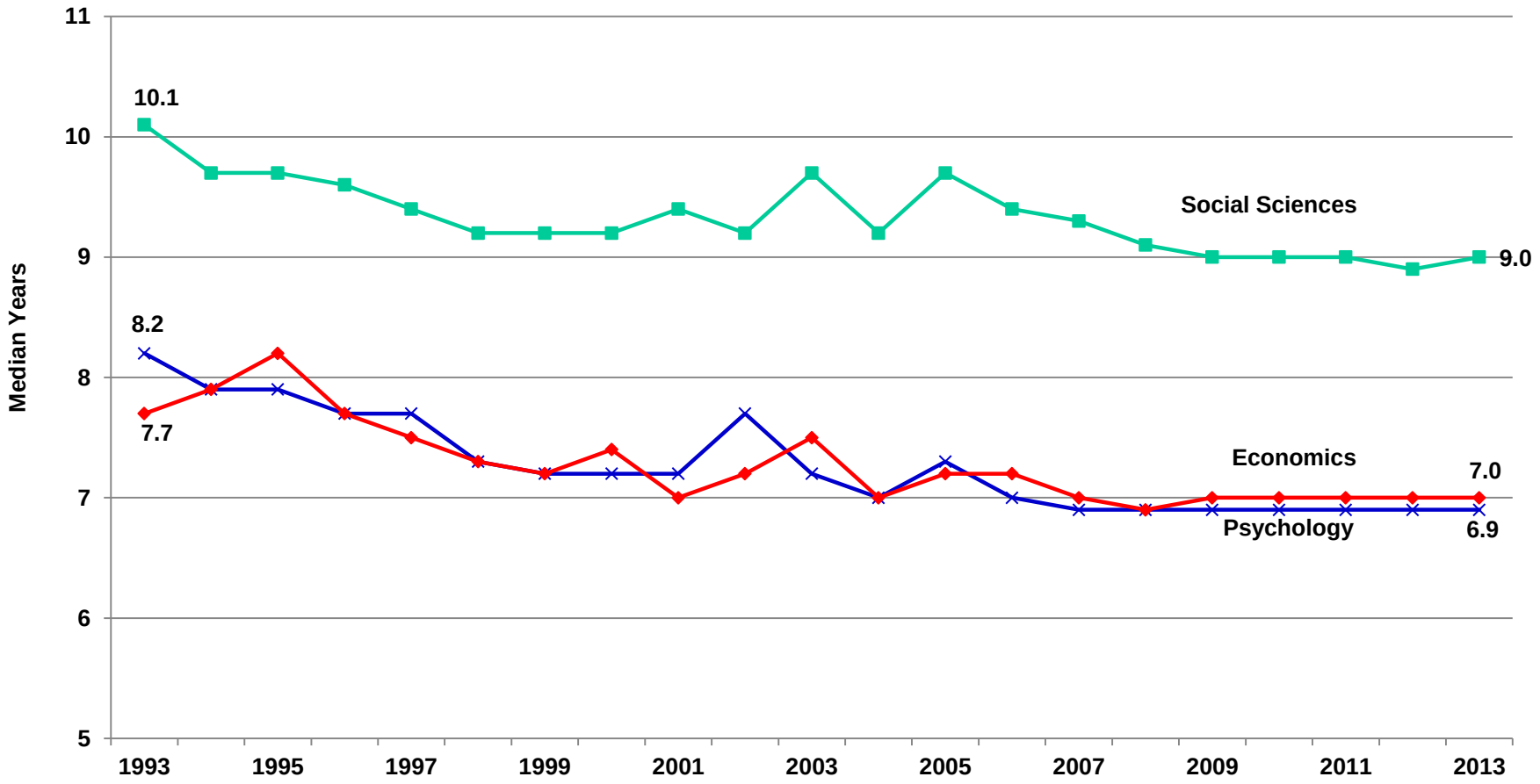
How long does it take to get a PhD in the SBE sciences?

Median Years to Degree by Field of Degree,1993–2013



SOURCE: *2013 Survey of Earned Doctorates*

Median Years to Degree by SBE Field of Degree, 1993–2013

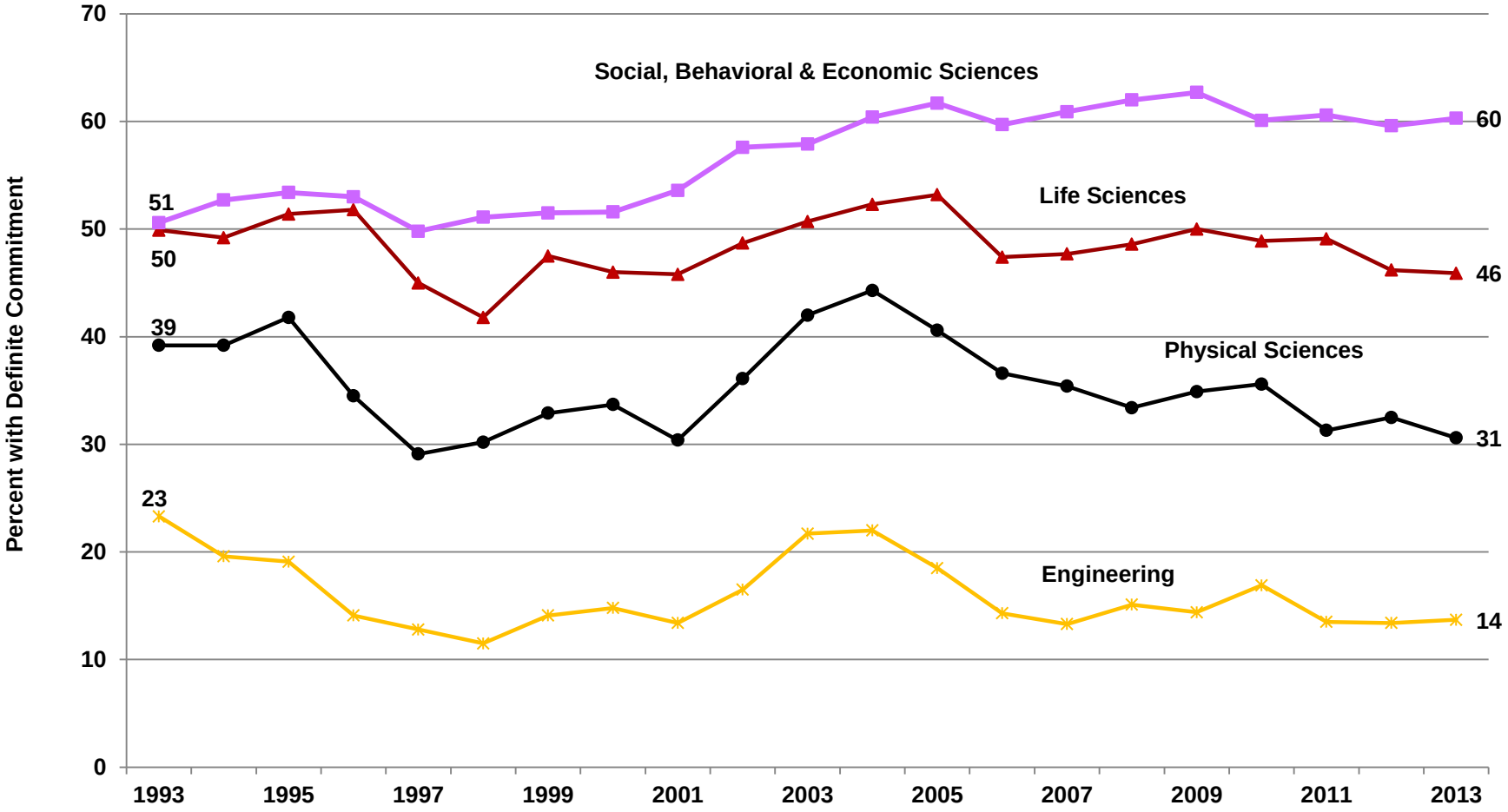


SOURCE: *2013 Survey of Earned Doctorates*

Issue 3

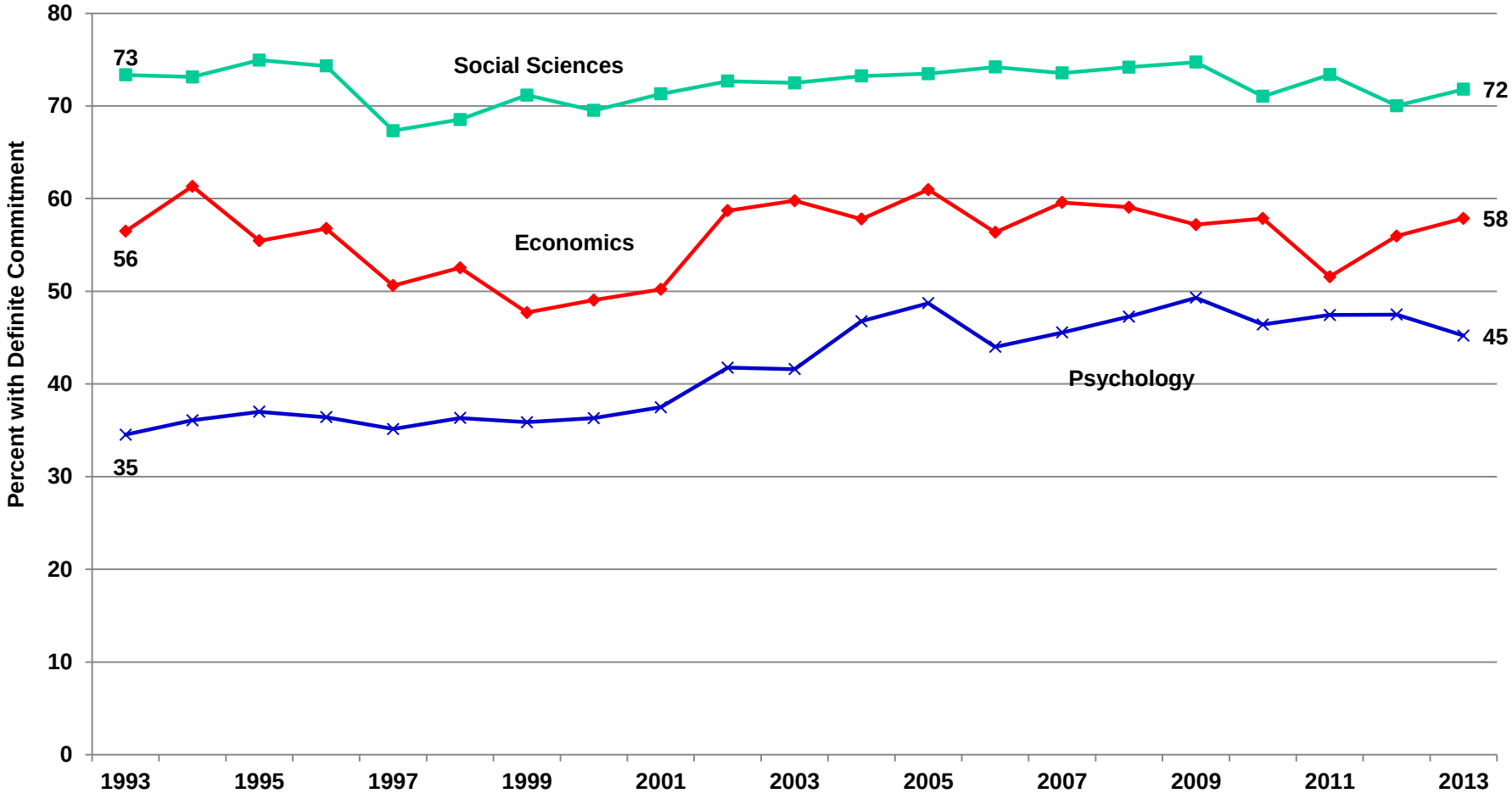
What does the job market look like for SBE PhDs?

Definite Academic Employment Commitments for Non-postdocs in U.S., by Field of Degree: 1993–2013



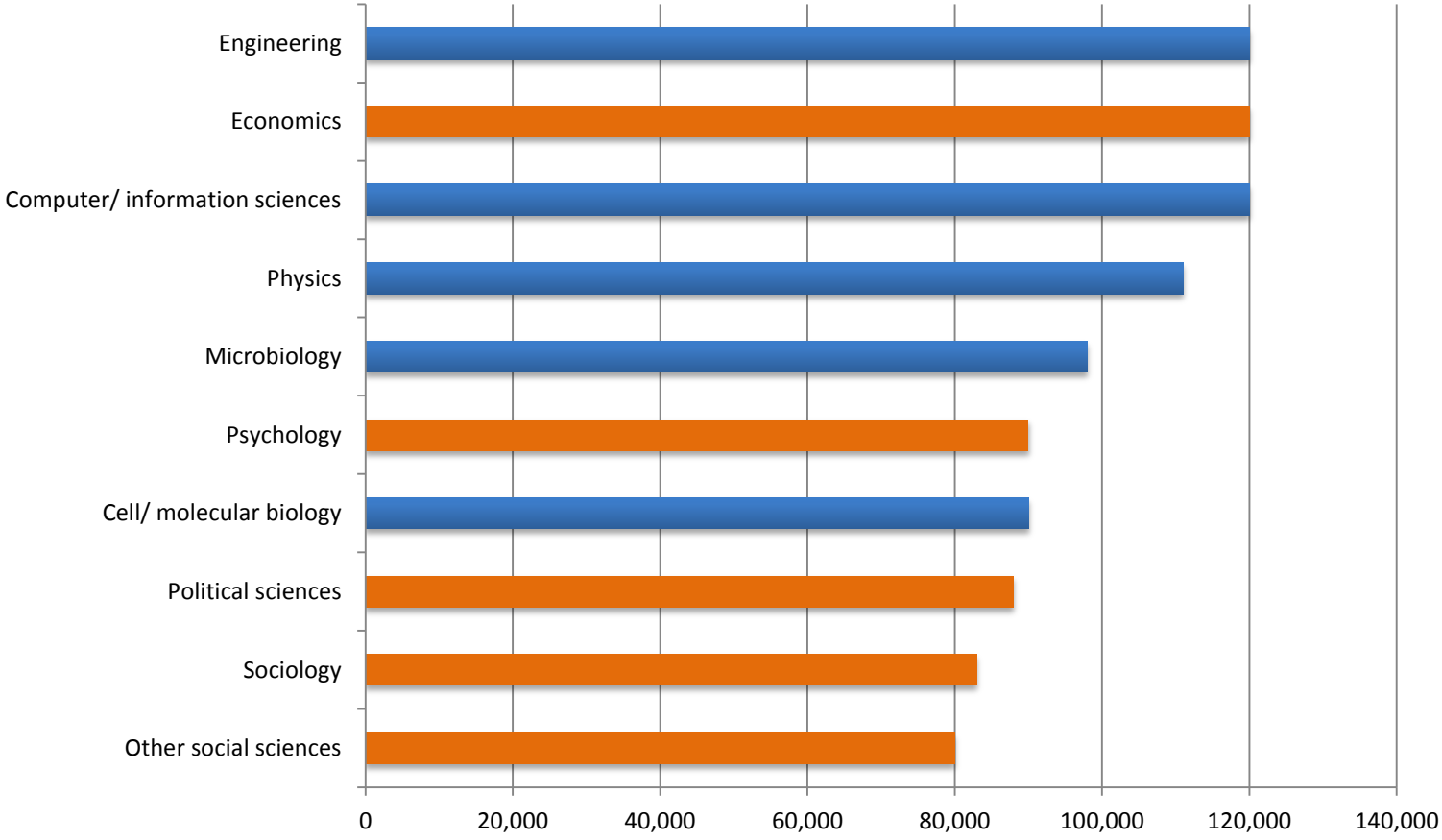
SOURCE: *2013 Survey of Earned Doctorates*

Definite Academic Employment Commitments for Non-postdocs in U.S. by SBE Field of Degree, 1993–2013



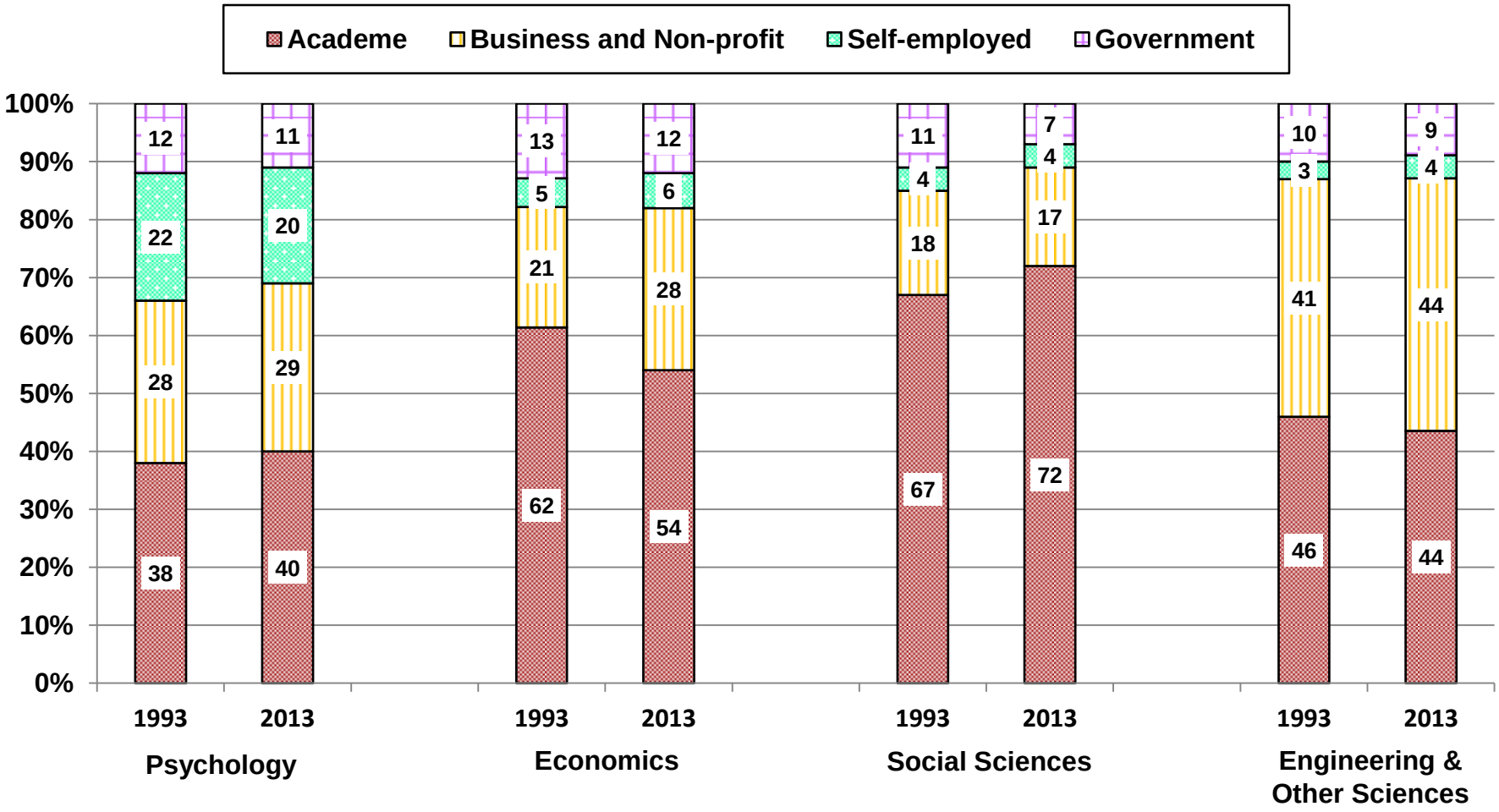
SOURCE: *2013 Survey of Earned Doctorates*

Starting PhD Salaries by Field: SBE Science in Orange



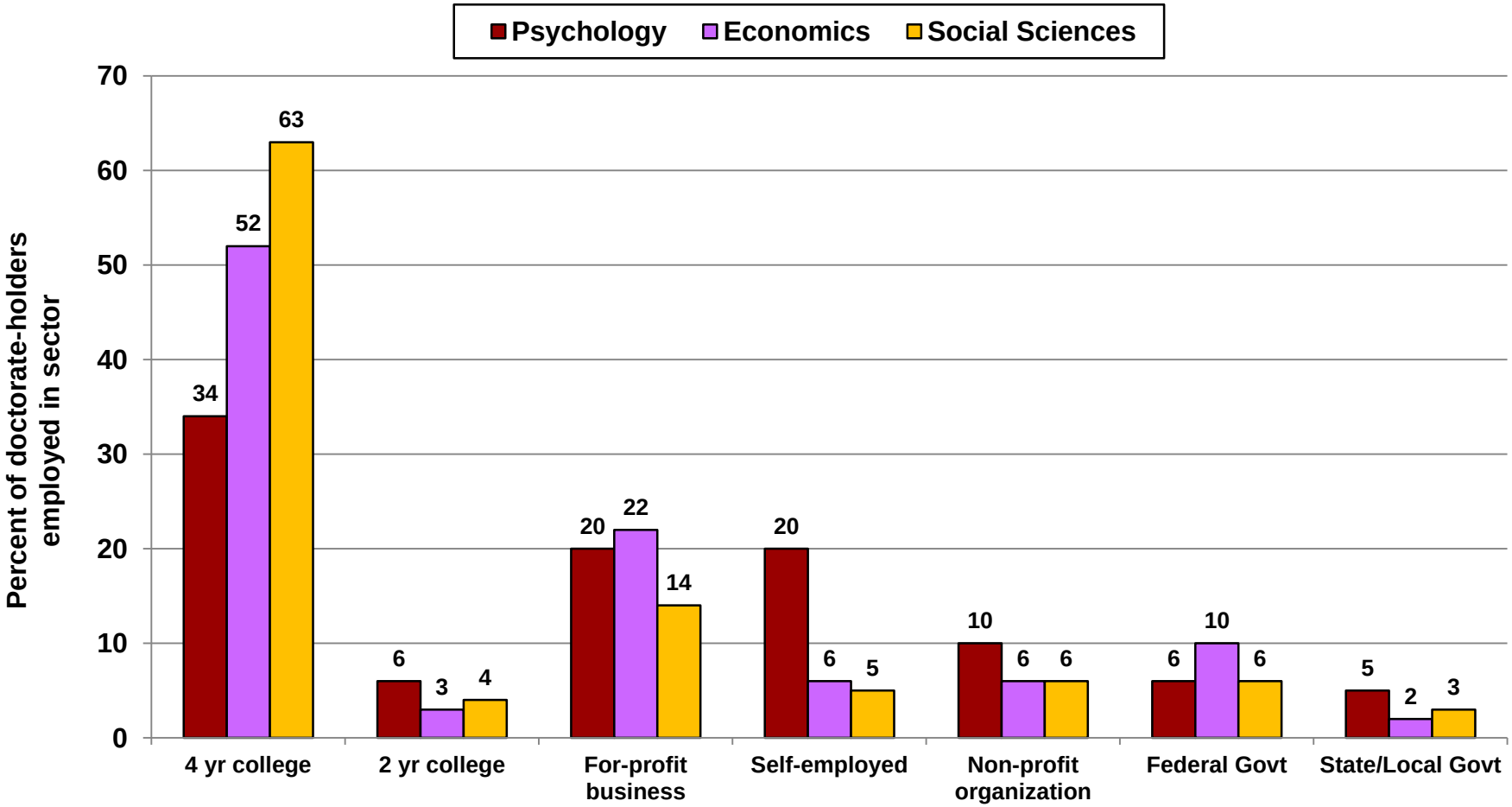
SOURCE: NSF, NIH, USED, USDA, NEH, NASA, Survey of Earned Doctorates, 2013

Employment Sector of Science and Engineering Doctorate-holders, 1993 and 2013



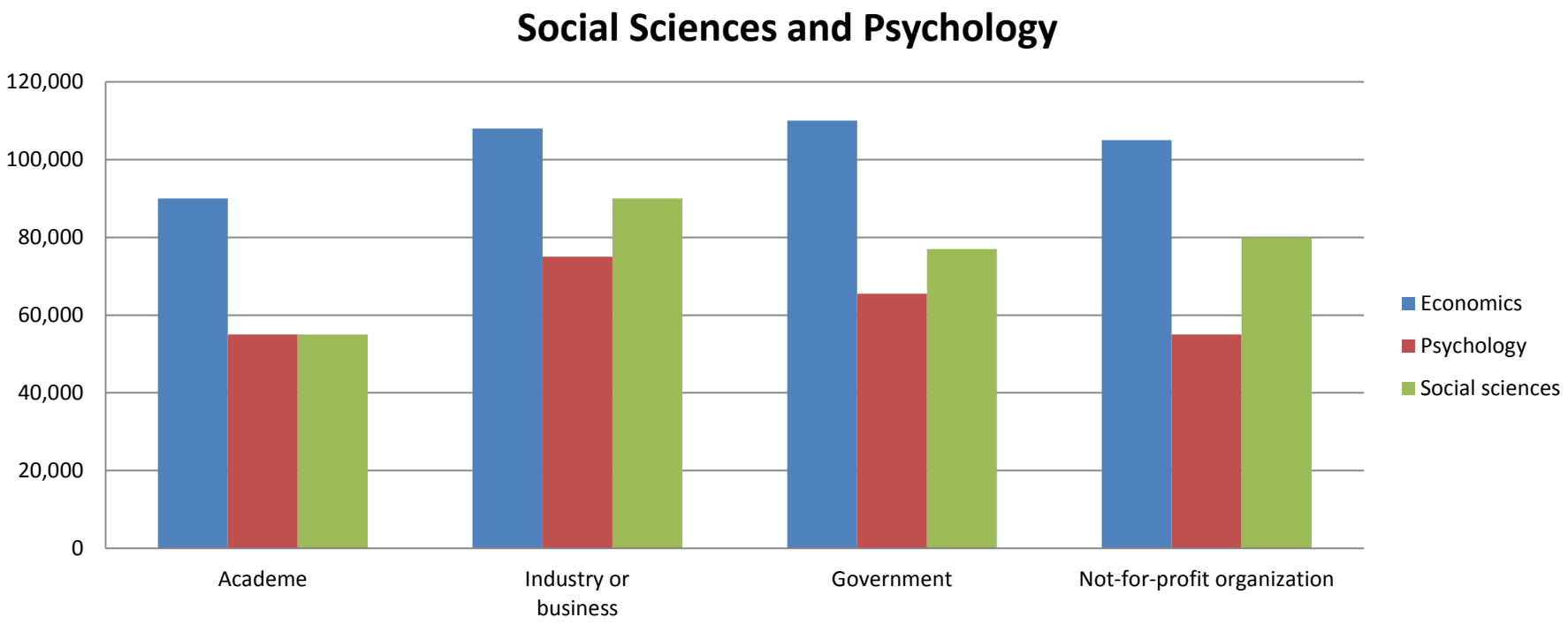
SOURCE: *2013 Survey of Doctorate Recipients*

Employment Sector of SBE Doctorate-holders: 2013



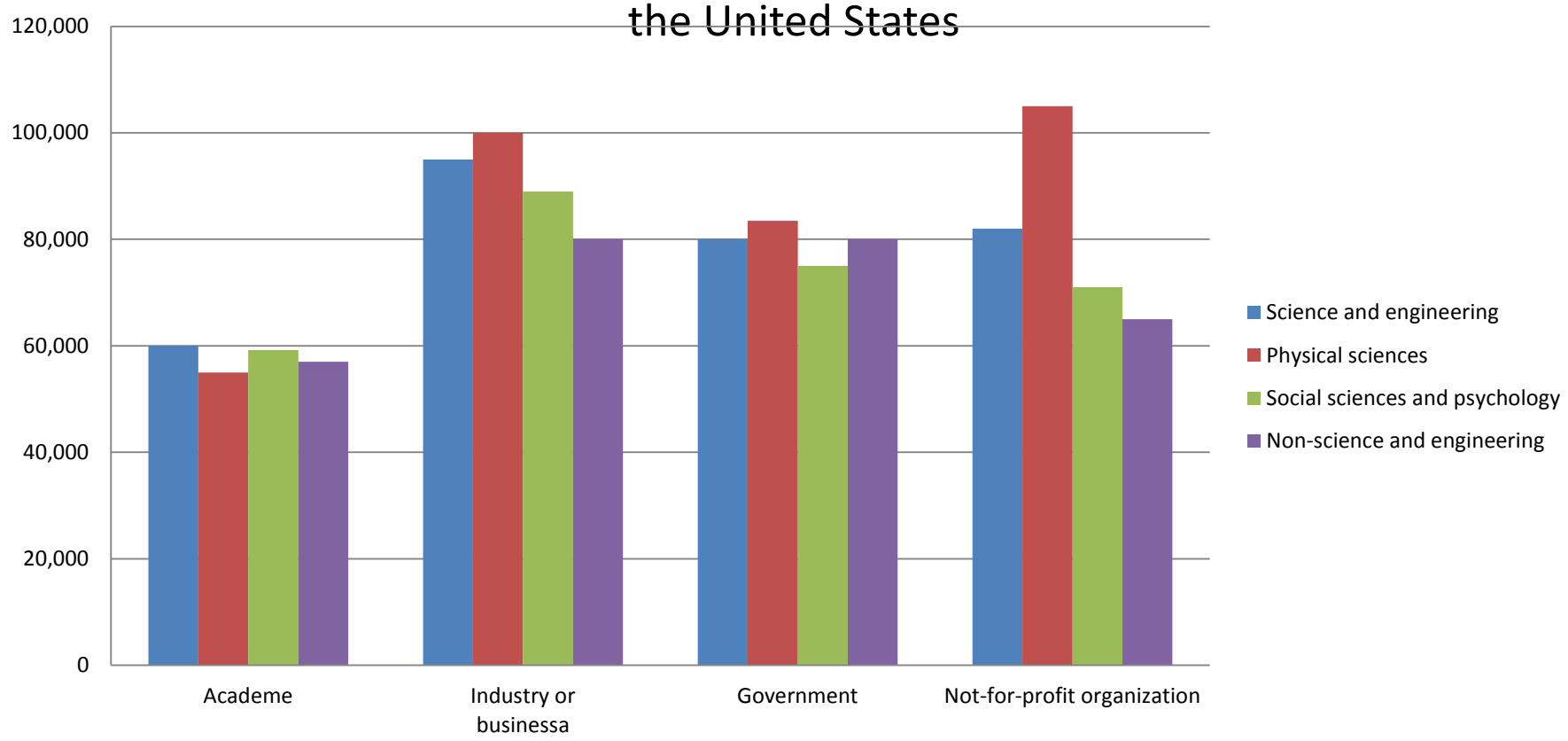
SOURCE: *2013 Survey of Doctorate Recipients*

Starting Salaries of 2012 PhDs by Discipline and Employer Category



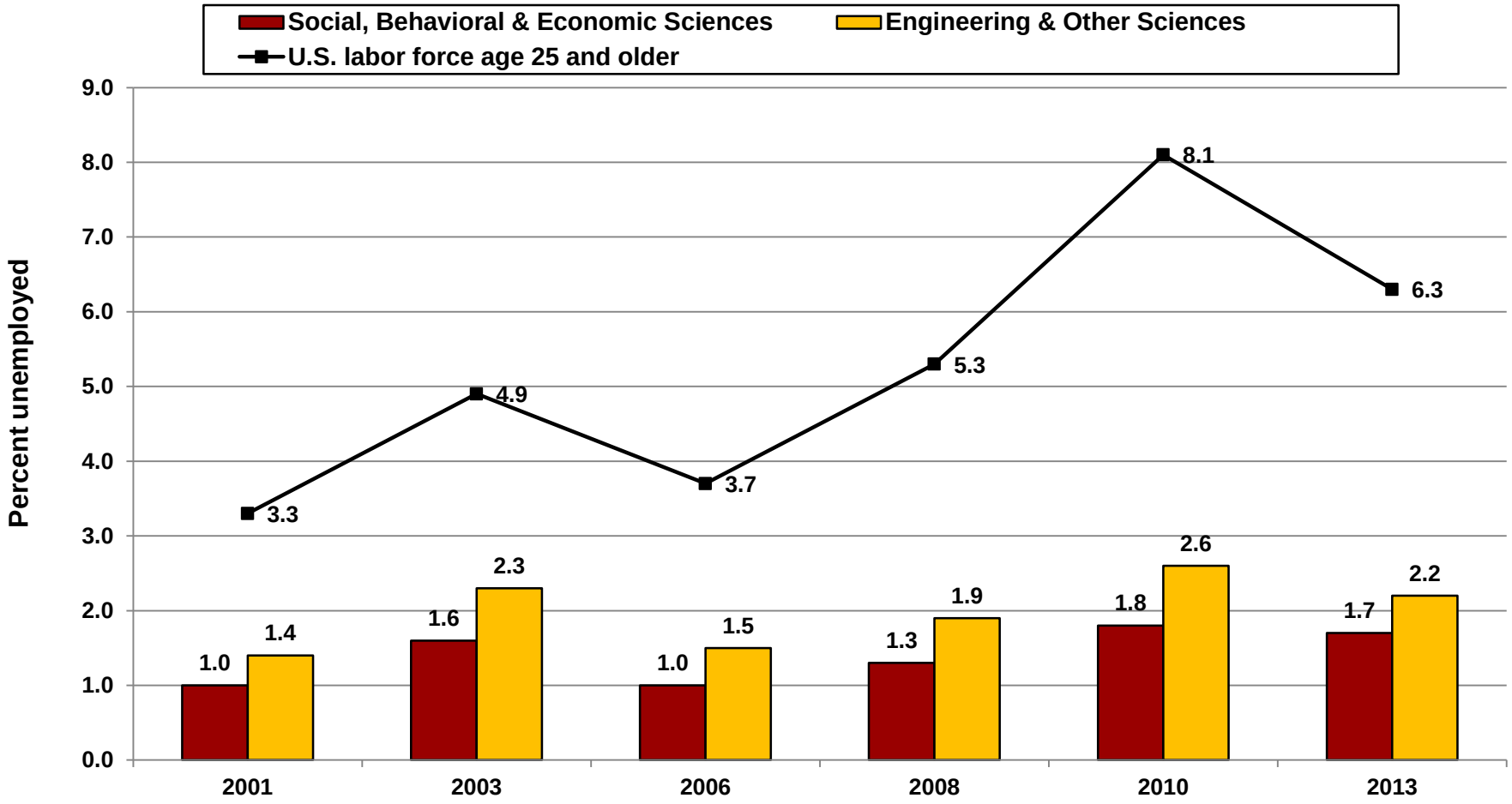
SOURCE: NSF, NIH, USED, USDA, NEH, NASA, Survey of Earned Doctorates

Median Basic Annual Salary for Doctorate Recipients with Definite Postgraduation Plans for Employment (academic and non-academic) in the United States



SOURCE: NSF, NIH, USED, USDA, NEH, NASA, Survey of Earned Doctorates, 2012

Unemployment Rate for Science & Engineering Doctorate-holders, Selected Years 2001-13

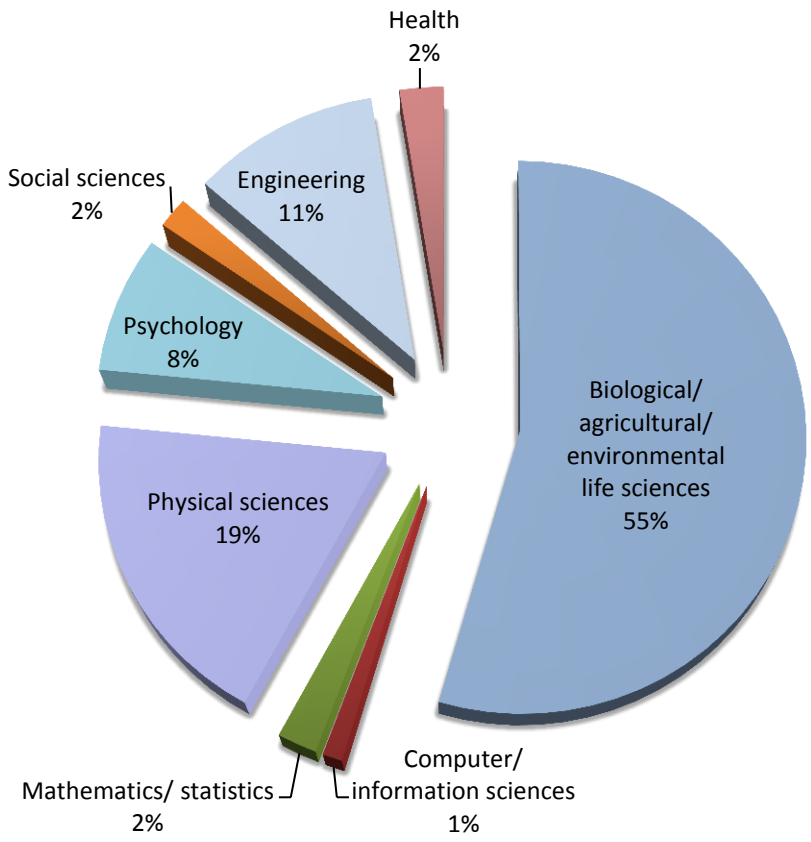


SOURCE: *2013 Survey of Doctorate Recipients*

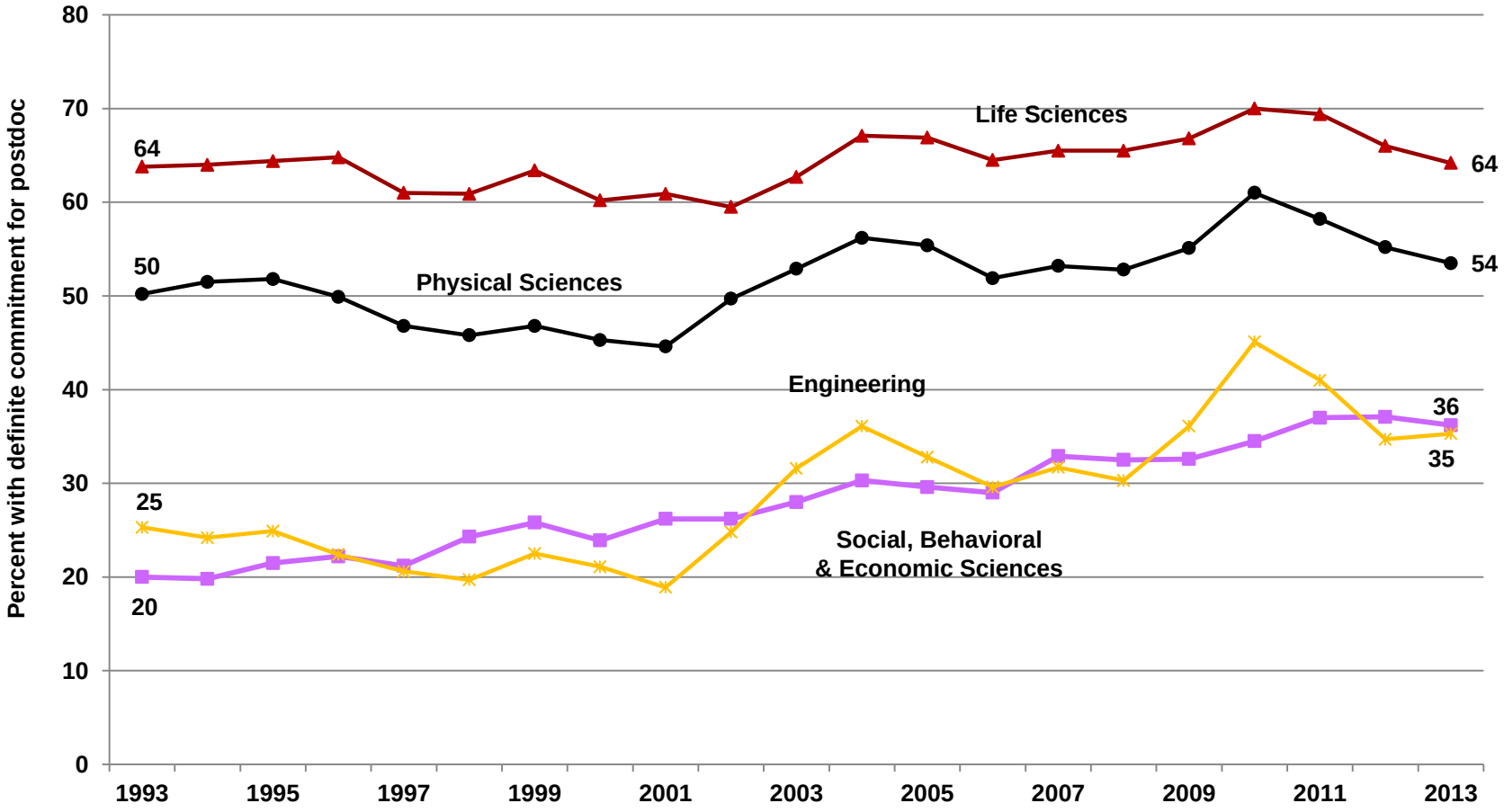
Issue 4

Postdoctoral Training. How many post-docs should we train?

Post-Docs By Field: Psychology 8%, Social Science <2%



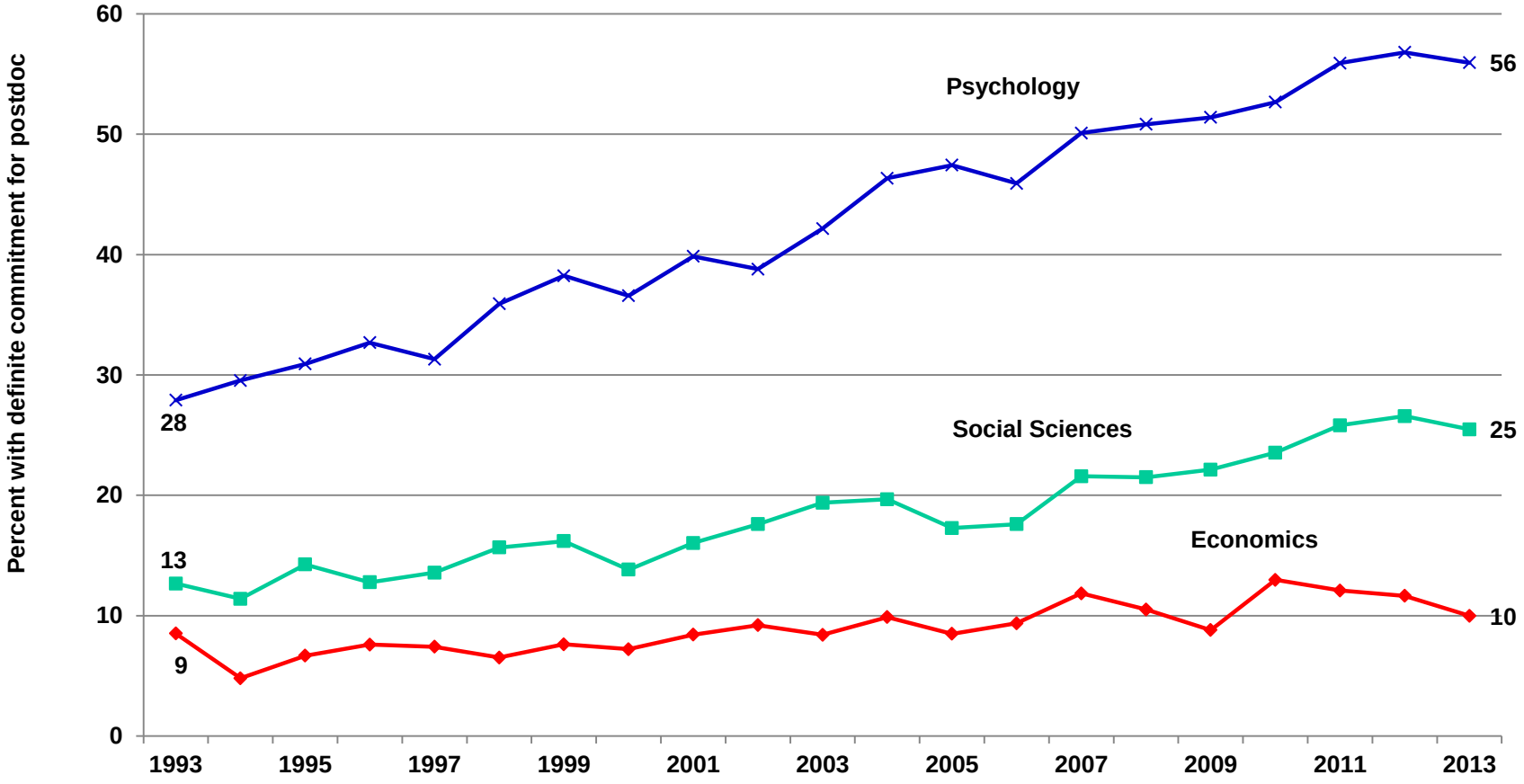
Plans for Postdoc Training of Science & Engineering Doctorates, 1993–2013



NOTE: percentages based on number of doctorate recipients reporting definite commitments for postdoc or employed position in the year following award of doctorate

SOURCE: *2013 Survey of Earned Doctorates*

Plans for Postdoc Training of SBE Doctorates, 1993–2013



NOTE: percentages based on number of doctorate recipients reporting definite commitments for postdoc or employed position in the year following award of doctorate

SOURCE: *2013 Survey of Earned Doctorates*

SBE Post-Docs Are Predominantly in Educational Institutions

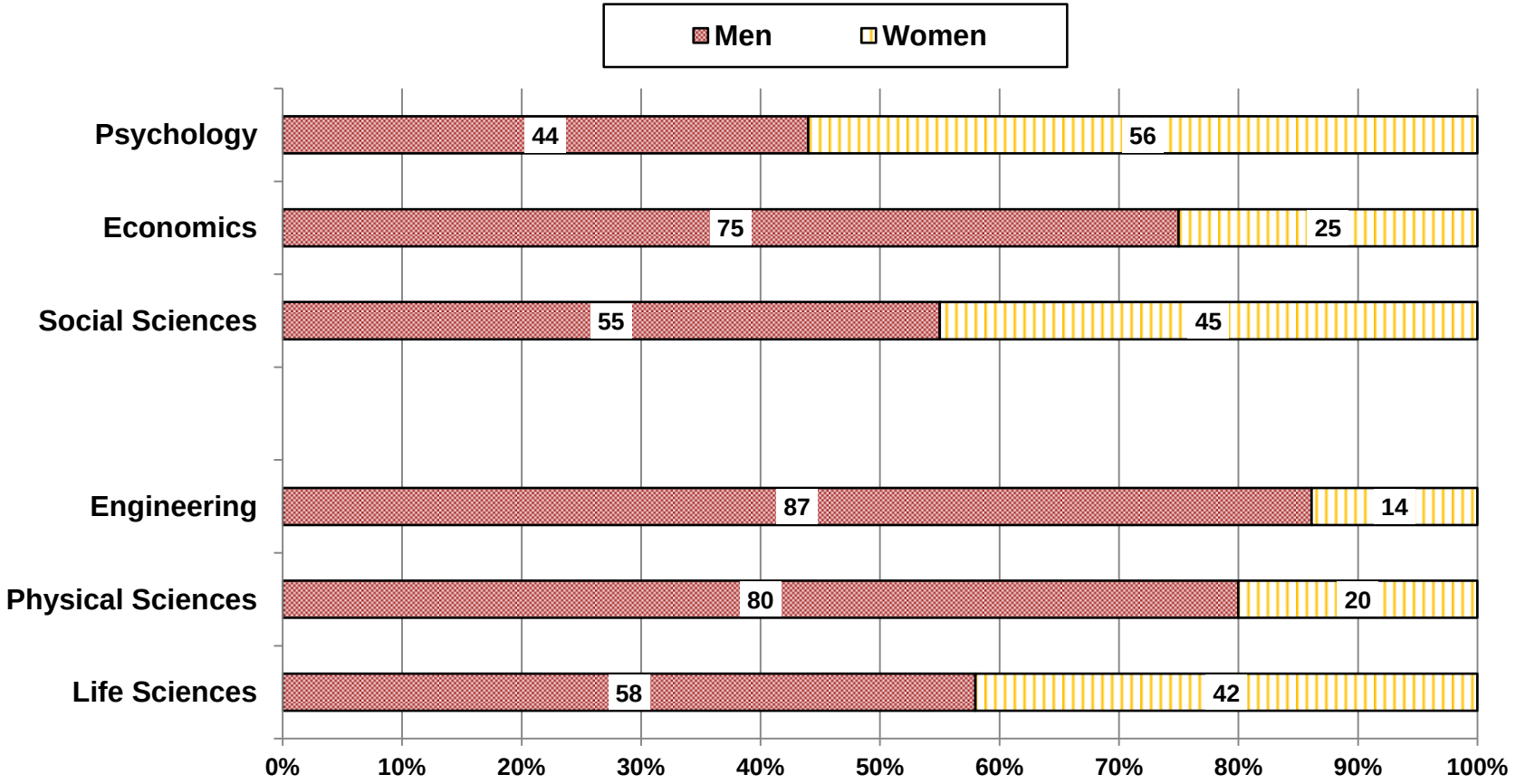
- Among Postdoctoral Trainees in 2008
  - About a third of life science trainees were in industry or government
  - For social science trainees, the number outside of educational settings was so small that it had to be suppressed because of confidentiality

Issue 5
Possible Challenges to Graduate Education

Gender

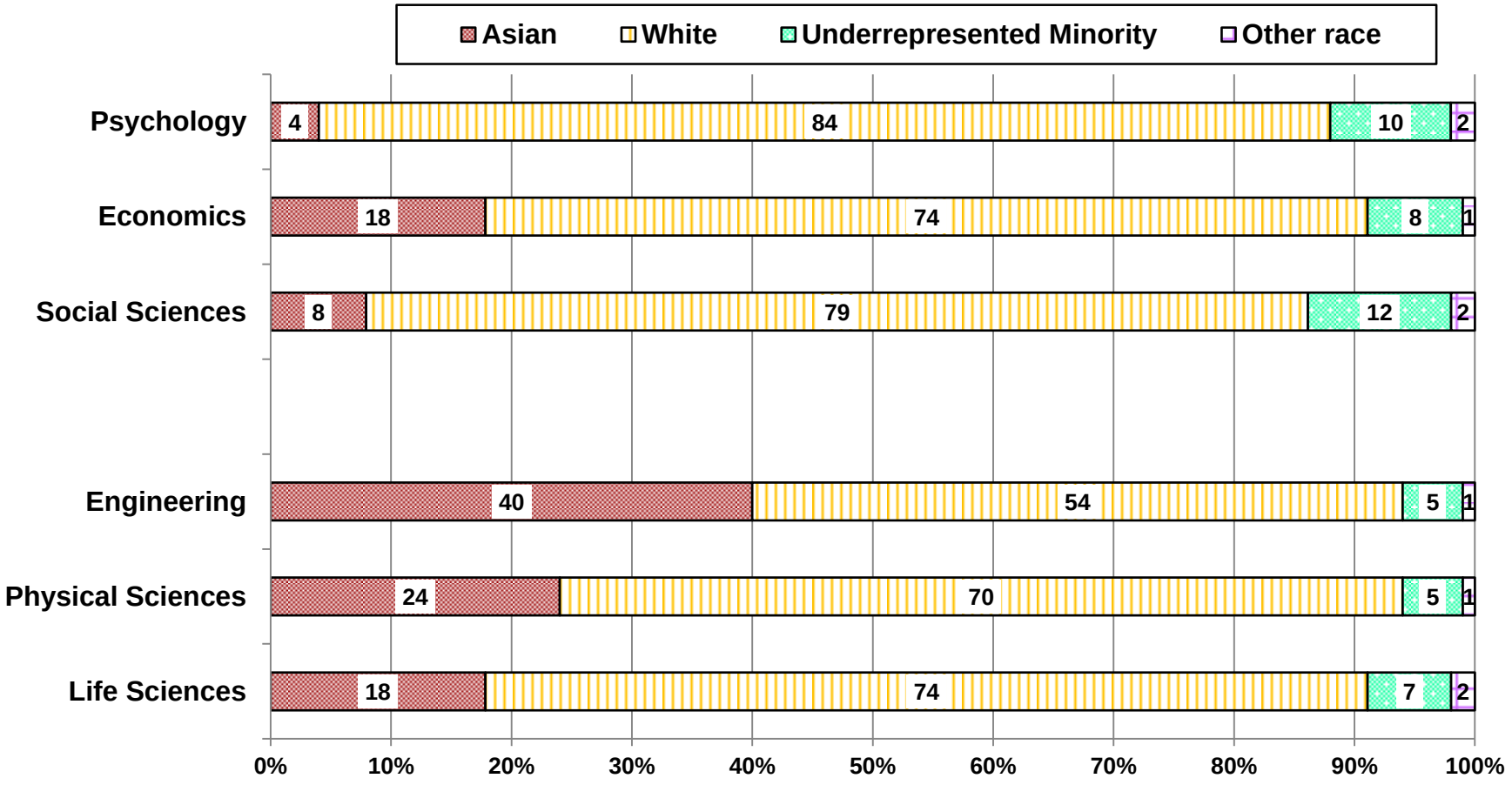
Race and Ethnicity

Employed Science & Engineering Doctorate-holders by Gender, 2013



SOURCE: *2013 Survey of Doctorate Recipients*

Employed Science & Engineering Doctorate-holders by Race/Ethnicity, 2013



NOTE: Underrepresented Minority includes American Indian/Alaska Native, Black or African American, and Hispanic or Latino

SOURCE: *2013 Survey of Doctorate Recipients*

Conclusions

- Social and behavioral scientists are a significant component of the science workforce
  - About the same proportion of new graduates as physical science and engineering
- One size does not fit all
  - Significant differences in pay
  - Substantial differences in plans for postdoctoral training
- Trend toward less academic employment in tenure track jobs
  - Average pay better outside of the academy

Are We Prepared for the Future?

- The nature of data and data collection are rapidly changing
  - Big data
  - Electronic data capture
- Greater emphasis on interdisciplinary and multidisciplinary training
- Changing job market
  - More non academic employment
  - Career paths for part time faculty

What should the PhD curriculum look like?

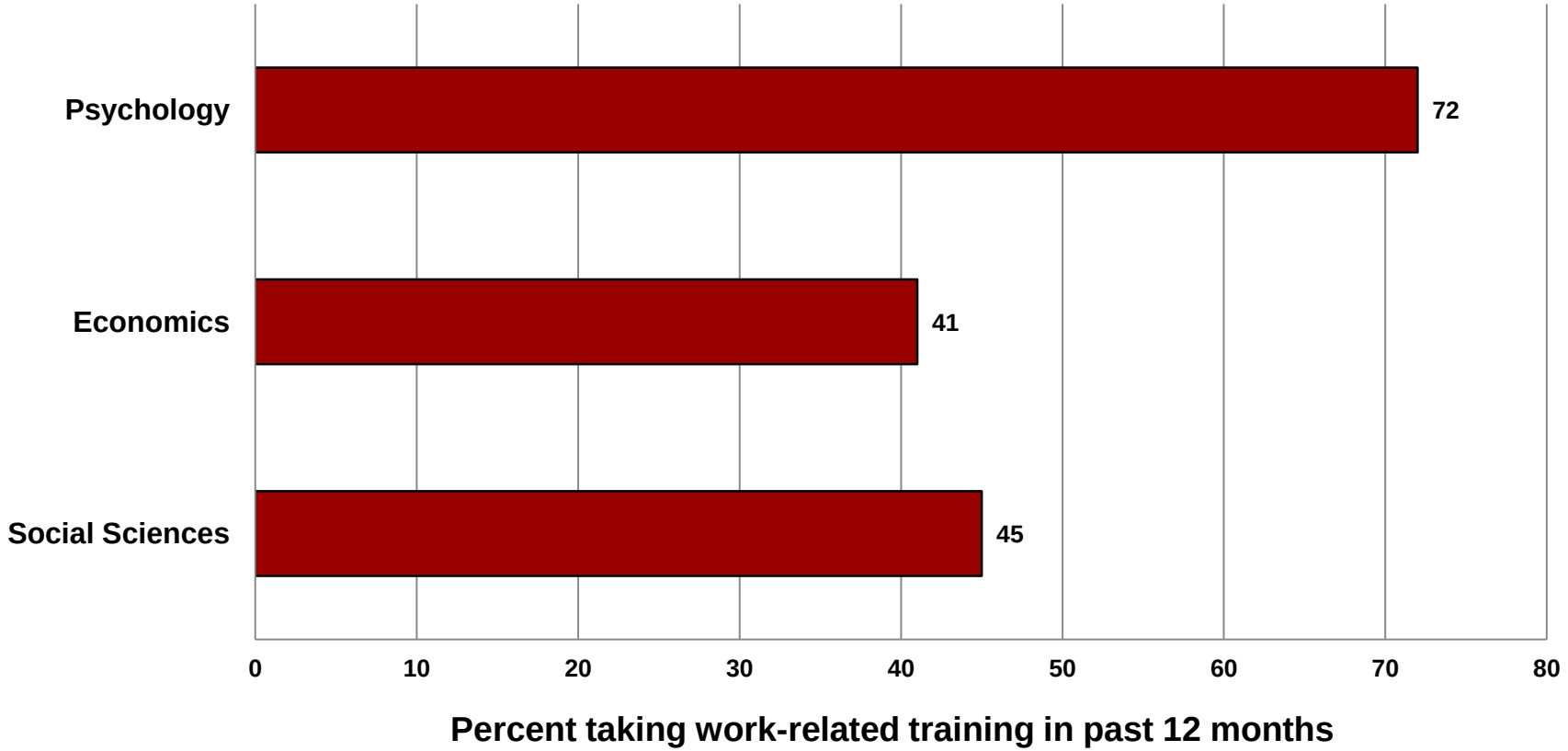
- Current Curriculum
  - Focused primarily on training professors
  - Disciplinary focused
  - Methods
    - Original small sample data collection
    - Non-harmonized measures
    - Emphasis on sample statistics (ANOVA, Regression)
- Curriculum for Future
  - Trains for a range of job opportunities
  - Team science, prepares for multidisciplinary work
  - Methods
    - Big data
    - Harmonized measures
    - Data linkage
    - Pattern recognition
    - Systems Science

For Discussion

- Are we training the right number of behavioral and social science PhD students?
- Are we training people for the appropriate range of employment opportunities?
- How many post-doctoral fellowships should we plan for?
- Multidisciplinary planning
- Will students admitted this year be ready for research roles when they graduate in 2021?

Backup/Supplemental Slides

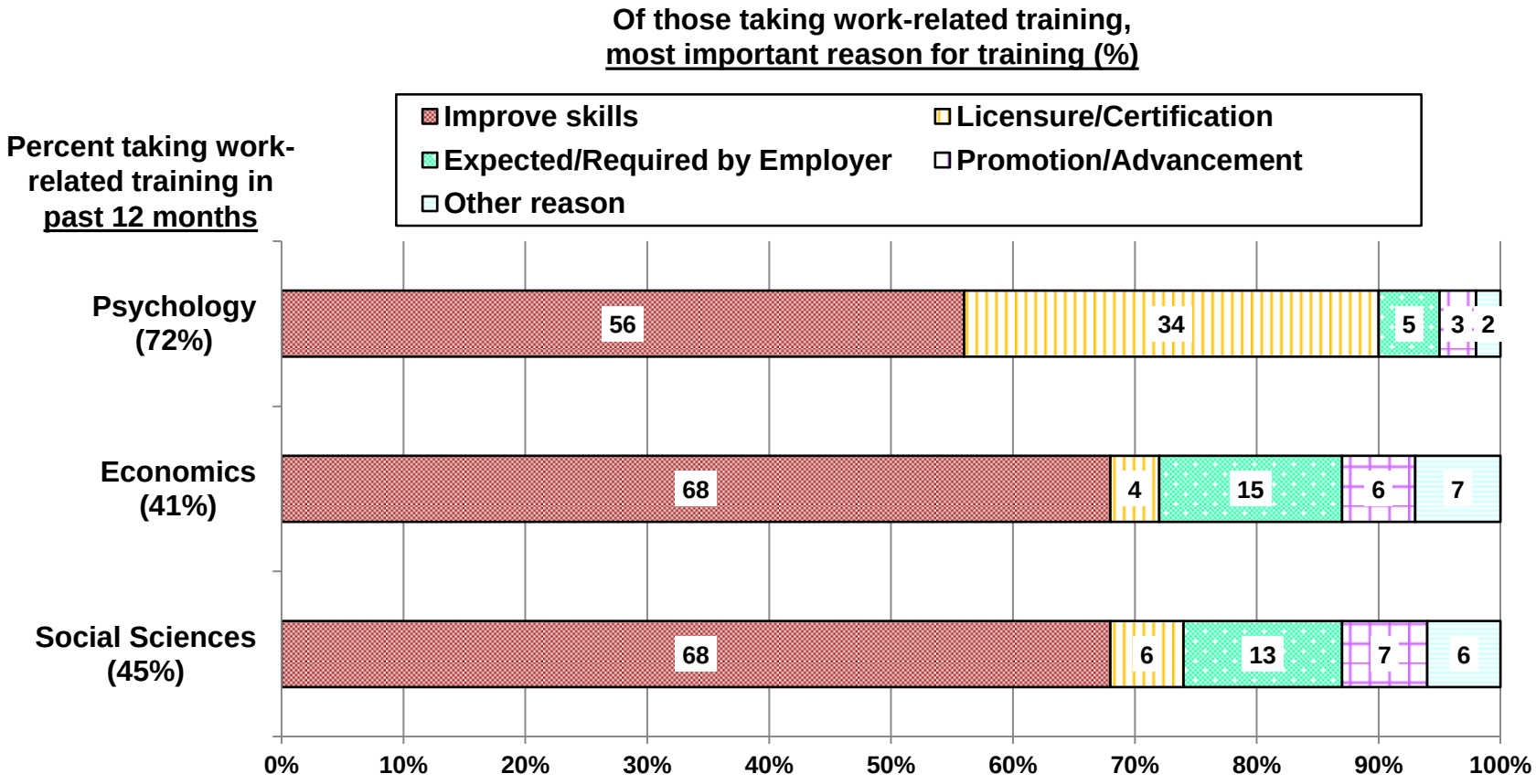
Figure 17: Work-related Training Taken by Employed SBE Doctorate-holders by Field of Degree, 2013



Survey item: *During the past 12 months, did you take any work-related training, such as workshops or seminars? (Y/N)*

SOURCE: *2013 Survey of Doctorate Recipients*

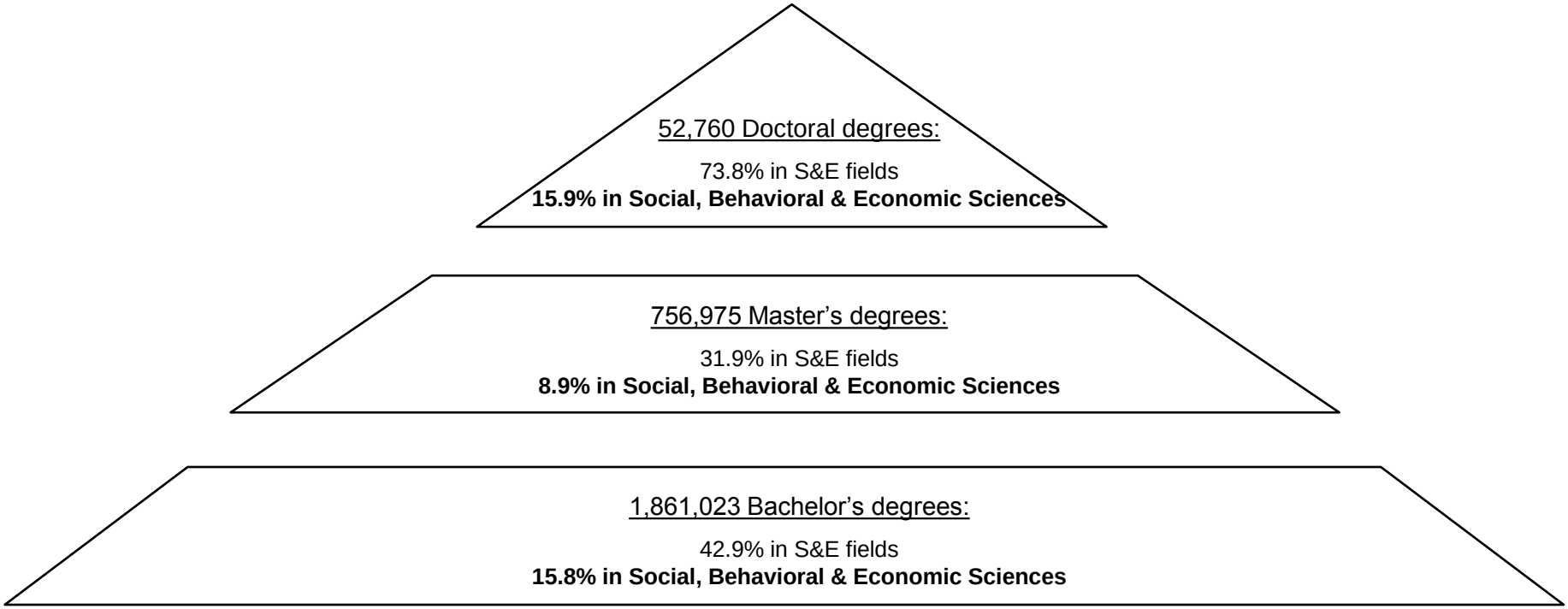
Figure 18: Reasons Given for Work-related Training of Employed SBE Doctorate-holders by Field of Degree, 2013



Survey item: *During the past 12 months, did you take any work-related training, such as workshops or seminars? (Y/N)*

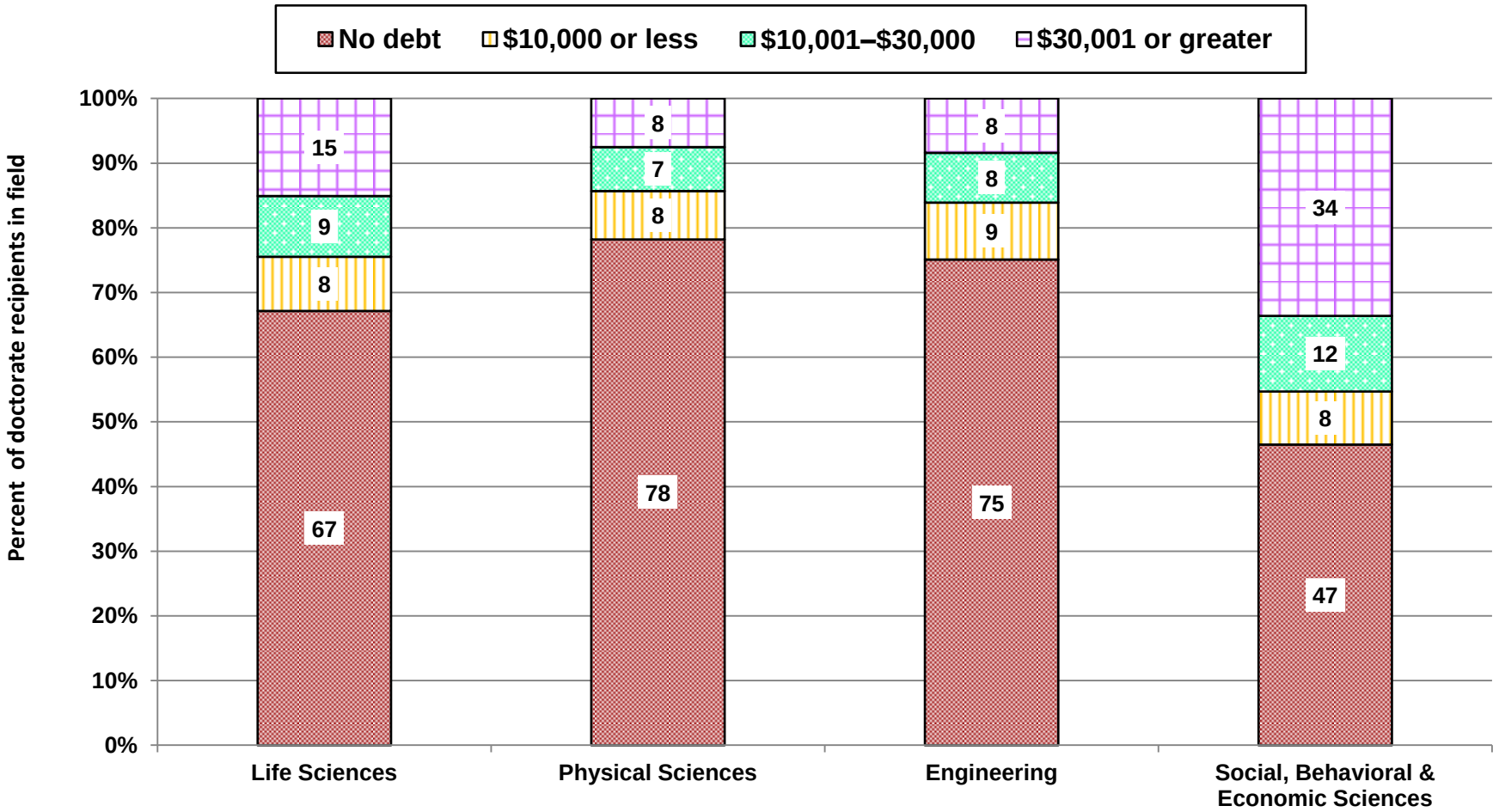
SOURCE: *2013 Survey of Doctorate Recipients*

Figure 19: Degrees Awarded by Degree Level and Field of Degree Category, 2013



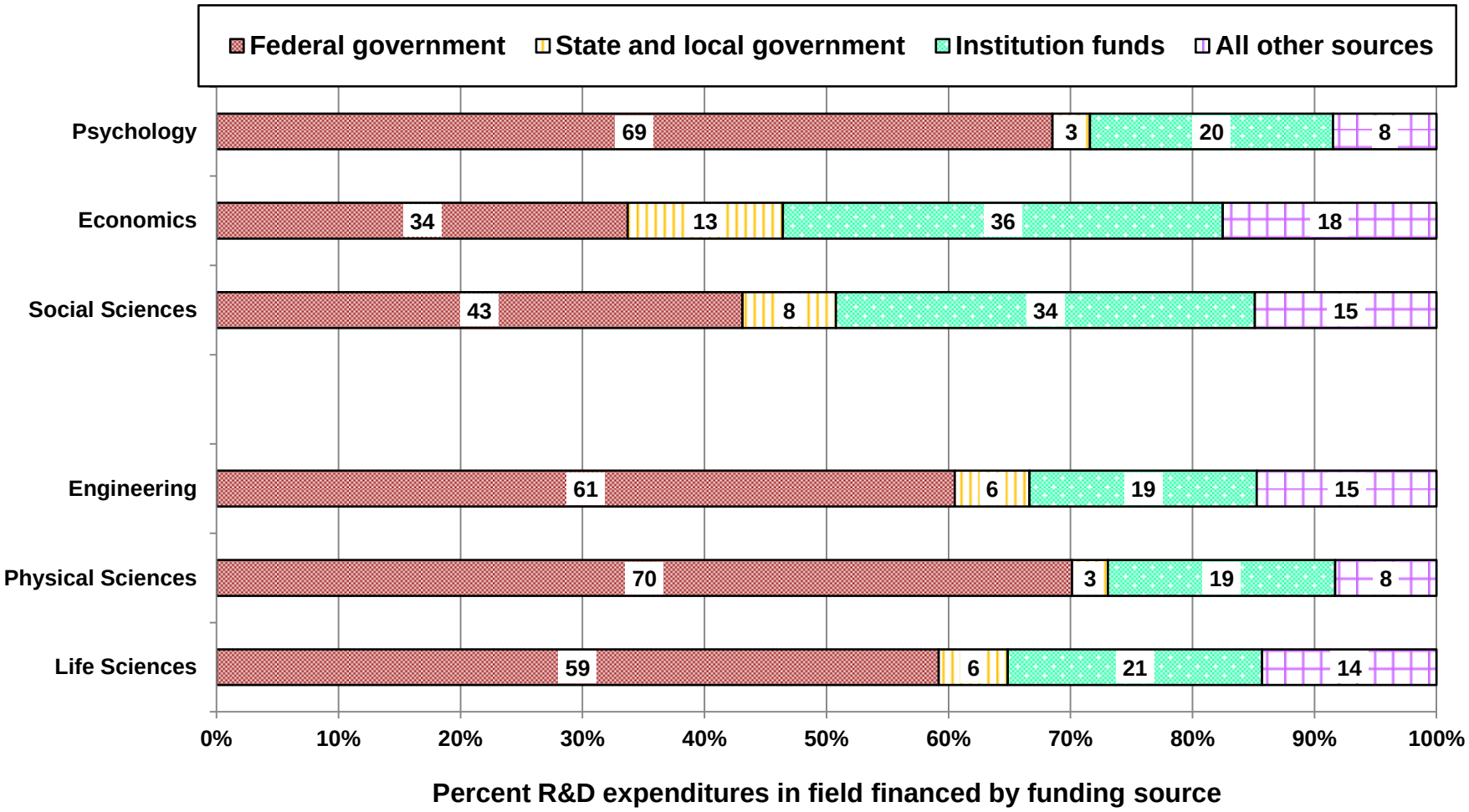
SOURCES: *2013 Survey of Earned Doctorates* and *2013 Completions Survey* (Education Department)

Figure 20: Graduate Education-related Debt by Field of Degree, 2013



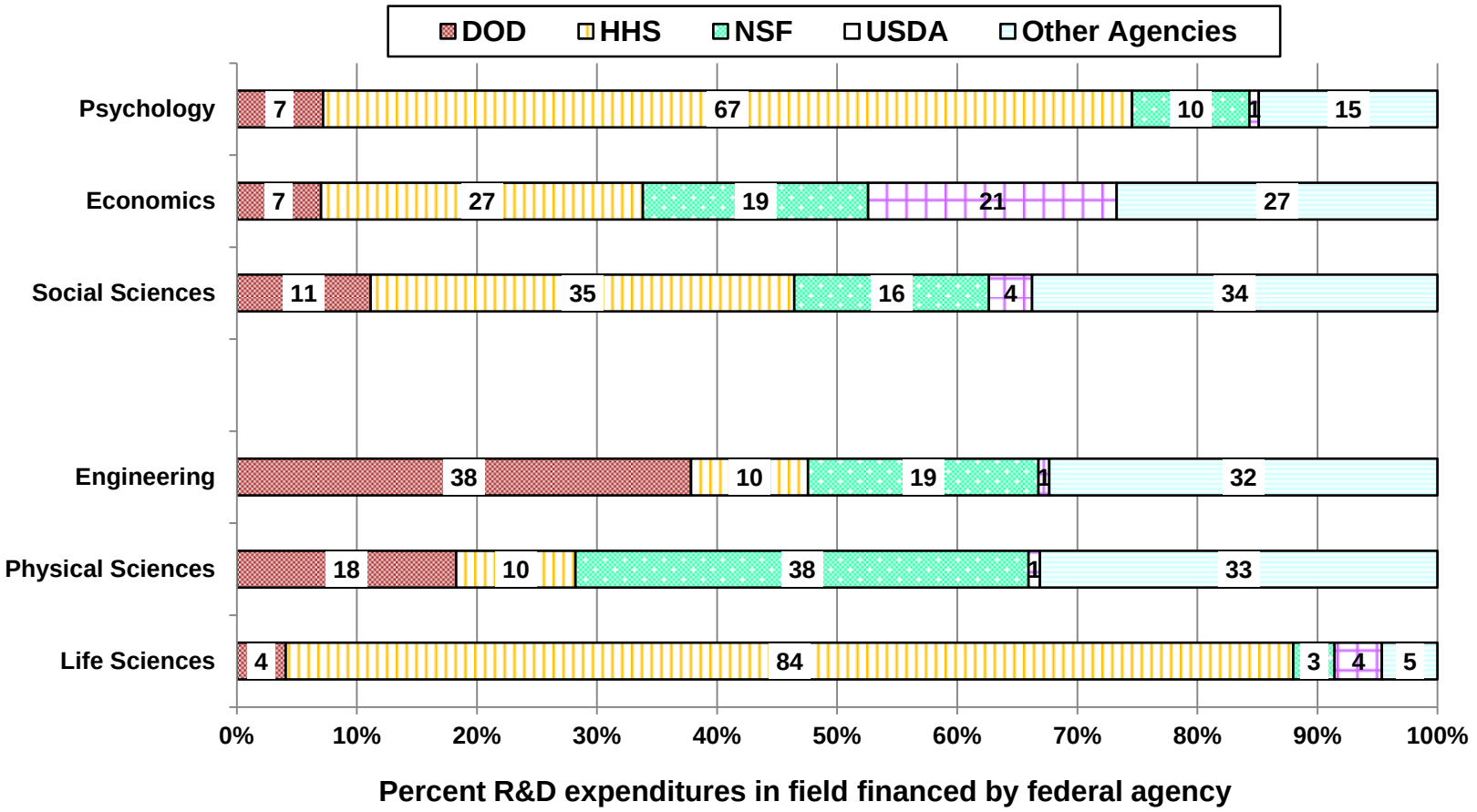
SOURCE: *2013 Survey of Earned Doctorates*

Figure 21: Higher Education R&D Expenditures by Source of Funds and R&D field, 2013



SOURCE: *2013 Higher Education Research and Development Survey*

Figure 22: Federally Financed Higher Education R&D Expenditures by Federal Agency and R&D Field, 2013



DOD = Department of Defense HHS = Health & Human Services NSF = National Science Foundation USDA = U.S. Department of Agriculture
Other Agencies includes National Aeronautics and Space Administration, Department of Energy, and several smaller agencies

SOURCE: *2013 Higher Education Research and Development Survey*